

- [RSS Feeds](#)

Credit: Daud Yussuf/Reuters



Recent Articles

- [See All |](#)
- [Daily News Archive](#)
- [The Shocking Truth About...](#)
- [The Lost World, Now in Color](#)
- [A Master Blueprint for Making...](#)
- [Venus Flytrap Material Captures...](#)
- [Top Articles Last Month](#)
- [All Free Articles](#)
- [ScienceInsider](#)
- [Origins Blog](#)

My Science

- [My Folders](#)
- [My Alerts](#)
- [My Saved Searches](#)
- [Sign In](#)

Passing the Buck on Environmental Damage

By Elizabeth Quill
ScienceNOW Daily News
22 January 2008

Humans inflicted \$47 trillion worth of damage to the environment from 1961 to 2000, according to a new study, and poor nations are disproportionately footing the bill. Taking their estimates a step further, the researchers conclude that high- and middle-income nations owe poor nations \$3.2 trillion for the damage their development has caused.

Sixty percent of ecological services--benefits such as clean air for breathing or timber for building--are degraded or being used unsustainably, according to the Millennium Ecosystem Assessment (*Science*, 1 April 2005, p. 41). However, attaching monetary value to these damages is difficult because the costs are typically ignored during economic transactions. An airline, for example, does not pay for the pollution it emits.

Despite the challenges, environmental scientist U. Thara Srinivasan of the University of California, Berkeley, and her colleagues wanted to ask an even bigger question: Who bears the costs of the damage? To simplify things, Srinivasan's team excluded areas that are hardest to monetize, such as loss of biodiversity, and instead focused on issues such as climate change, ozone layer depletion, and deforestation. First, using existing literature such as the Stern report, a U.K. study that discussed the effect of climate change on the economy (*ScienceNOW*, 30 October 2006), the researchers calculated the amount of damage done to the global environment between 1961 and 2000. The researchers then used existing literature to estimate how much of that damage, in dollars, was caused by high-, middle-, and low-income groups and how much these groups forgo in terms of lost ecological benefits.

The findings are striking, says Srinivasan. The highest estimates suggest humans have wrought \$47 trillion worth of damage to the environment over 4 decades. (For comparison, the global gross domestic product in 2007 is estimated at \$65 trillion.) Most of the blame lies with high- and middle-income nations. These countries have emitted the majority of greenhouse gases, for example, yet poor nations suffer more from the effects of the emissions, such as increased weather disturbances and increased incidence of infectious disease.

The study set the costs passed from the high- and middle-income countries to the poor countries for climate change alone at \$3 trillion, a value greater than the poor countries' collective foreign debt. There are similar disparities for ozone-layer depletion and overfishing, the team reports online today in the *Proceedings of the National Academy of Sciences*. "To our knowledge, our study is the first to quantitatively look at where ecological footprints are falling," Srinivasan says. "Poor countries shoulder a disproportionate burden."

Srinivasan admits that there are a lot of uncertainties. The researchers had to take local estimates of annual damage--in some cases the only estimates available--and multiply those by the total area damaged and by the number of years of damage. Srinivasan says she expects the study to be controversial, but she does not intend the numbers to be taken literally. "Instead, we challenge people to think about the distribution of costs between nations," she says.

Economist Edward Barbier of the University of Wyoming, Laramie, says the effort is ambitious but unrealistic. He notes that there are simply not enough data to undertake this type of global analysis. "It's a step backward from serious attempts to bring economists and ecologists to tackle complex environmental problems, including valuing ecosystem services," he says. However, Daniel Cole, a political theorist at Indiana University School of Law in Indianapolis, says this study shows how far ecological economics has come in the past few decades. "The only thing worse than error-prone efforts to assign values to nonmarket goods may be not to make such efforts," he says.

Related sites

- [The Millennium Ecosystem Assessment](#)
- [The Stern Report](#)
- [International Society for Ecological Economics](#)

([skip to comments for this article](#))

[Previous Article](#) | [Next Article](#)

Comments

Thanks for your feedback. Please keep it polite and to the point.